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TELEPHONY

The Journal of the Telephone Industry

OCTOBER 14, 1944

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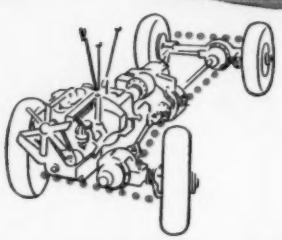

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OUTSTANDING "SERVICE RECORDS" IN COMMERCIAL — CONSTRUCTION — UTILITIES — OIL FIELDS — INDUSTRIAL — HEAVY DUTY WORK

ABC of the Telephone

By FRANK E. LEE

PART V. The Telephone Receiver. The fourth article in this series was published in the October 7 issue, page 40.

THE RECEIVER is the speaker of the telephone. In the receiver the modulated or fluctuating currents created by the transmitter at the distant station are transformed into sound waves. The fidelity of the sound reproduced by the receiver must be as good as the art of electro-acoustical design will permit.

Since so much of all electrically operated apparatus is dependent on magnetic conditions, a brief consideration of the simple compass will make it easier to understand the action that takes place in a telephone receiver or other apparatus depending on magnetic principles for their operation.

The pocket compass is familiar to almost everyone. It consists of a needle, usually darkened, one end of which swings around to point to the north. This end of the needle is properly called the "north-seeking pole," and the other part is called the "south-seeking pole." The needle moves because of the principle that *like* magetic poles repel each other, and *unlike* magnetic poles attract.

To explain this action, a bar magnet is suspended by a thread, as in *Fig. 1*, and a horseshoe is brought close to it. It is possible to tell the north and south poles of each magnet as follows: If the south pole of magnet A is brought near the north pole of magnet B, the latter will be attracted or will swing in the direction of the arrow. On the other hand, if the north pole of magnet A is brought close to the north pole of magnet B, the latter will be repelled or will swing away from magnet A as shown by the arrow.

It has been proved that the nearer the unlike poles are brought together, without touching, the stronger the lines of force will be between the two poles. If the two poles are allowed to touch each other, or a connecting strap of iron is placed across them, the lines of force will be strongest through the strap and of reduced intensity around the magnet. By bending a bar magnet in the form of a horse shoe, the magnetic field is intensified because the unlike poles are nearer to each other, and the magnetic pull or attraction is

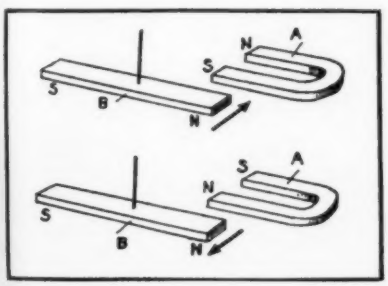
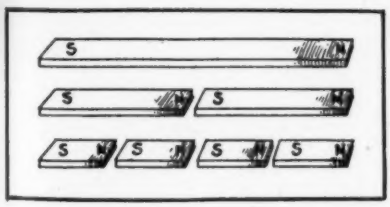


FIG. 1



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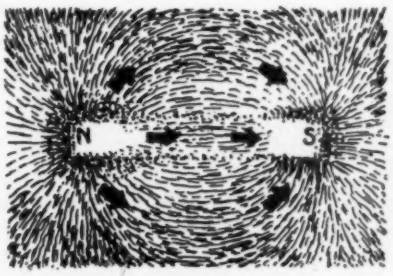


FIG. 3

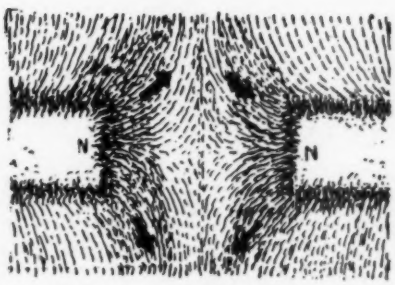


FIG. 4

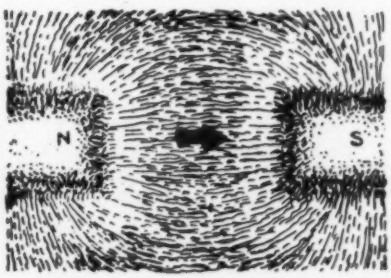


FIG. 5

FIG. 6

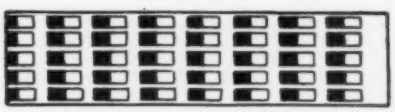


FIG. 7

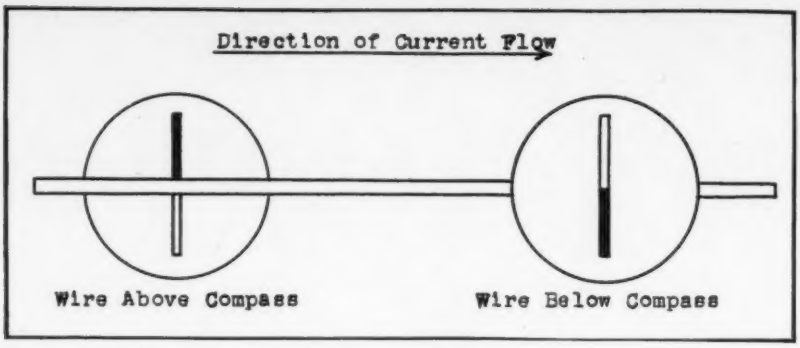


FIG. 8

greater than when the poles are widely separated as in a bar magnet.

Magnas Lapis, the natural magnet, was found by the ancients. The Chinese knew of its direction power as early as 121 A.D. This magnet stone attracted small pieces of iron. Many years later the Europeans re-discovered the direction power of the magnet or lodestone and suspended it from thread, floated it on water, or placed it upon rafts for use as a compass.

The first book on magnets written by Peregrimus, in 1269, gave the name poles to the active parts of the magnet, naming them north and south poles. He showed that unlike poles attract and like poles repel each other, and if a magnet were broken in two, each half would have a north and south pole, *Fig. 2*. If the process is repeated new poles will be formed each time the magnet is broken.

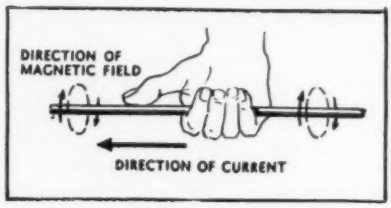


FIG. 9

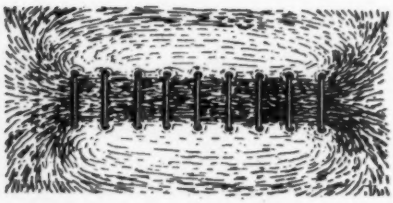


FIG. 10

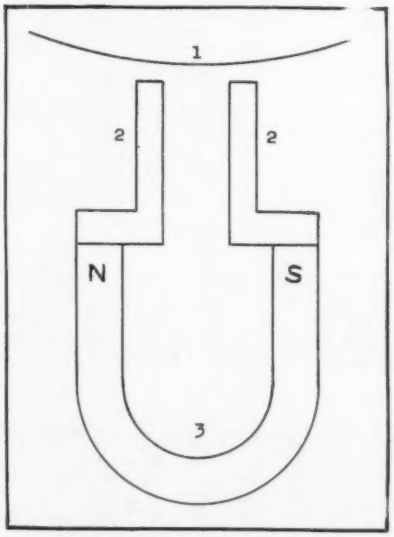


FIG. 11

Artificial magnets were made as far back as 1600 A.D. by striking hard iron or steel with a lodestone (magnetite). Thus, a magnetized needle evolved into the present-day compass, magnetized bars became bar magnets, etc. They are named permanent magnets but all of the so-called permanent magnets lose part of their magnetic strength if over-heated, vibrated or brought into the repulsive action of a more powerful magnetic influence.

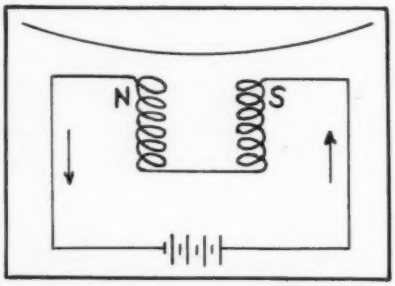


FIG. 12

A permanent magnet attracts a piece of soft iron which remains a magnet as long as acted upon by the permanent magnet. When the soft iron is withdrawn from the magnetic field, it loses most of its magnetism. The soft iron is said to be magnetized by magnetic induction. Soft iron is said to be a temporary magnet.

If a piece of stiff paper is placed over a bar magnet, some iron filings sprinkled on the paper and the paper slightly tapped with the finger, the fillings will assume a shape somewhat like that shown in *Fig. 3*. Notice that they arrange themselves in regular lines leading from one pole to another. The reason for this is that each small filing becomes slightly magnetized by the influence of the magnet and arranges itself in the direction in which a tiny compass needle would lie if it were at the same place.

From this, Michael Faraday (along about 1831) drew what he at that time called "lines of force" around a magnet. Black and Davis in their book "New Practical Physics" state, "A line of magnetic force may be defined as a line which indicates, at its every point, the direction in which a north-seeking pole is urged by the attractions and repulsions of all the poles in the neighborhood."

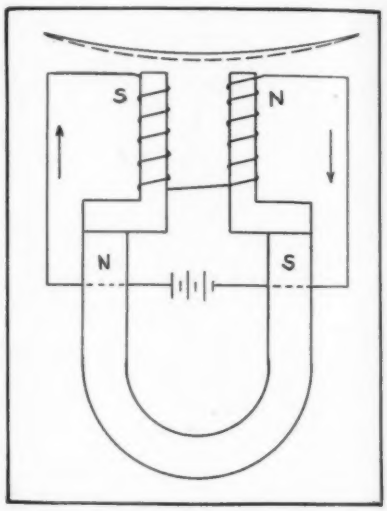


FIG. 13

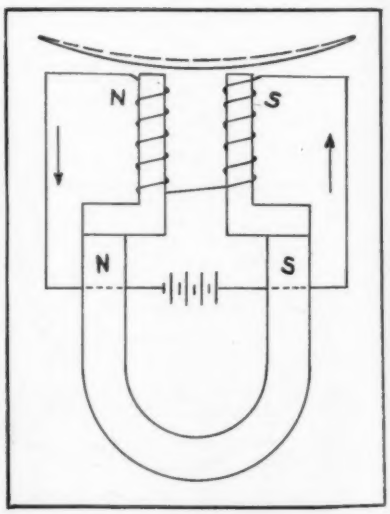


FIG. 14

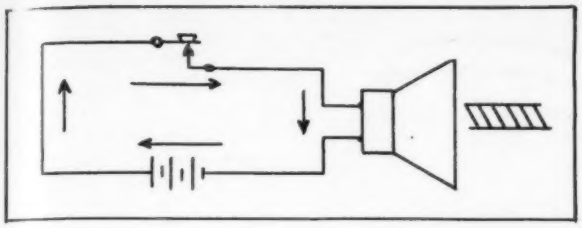


FIG. 15

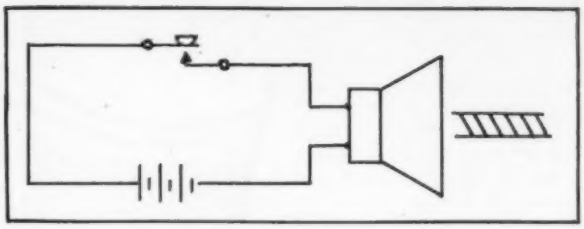


FIG. 16

It is a little difficult to see just why lines of force have these peculiar properties, but if these properties are assumed it becomes much easier to reason what will happen in many practical instances. Take *Fig. 4*, for example. Here, two unlike poles of two magnets are placed near each other, and, it will be noted that the iron filings indicate an attraction between the unlike poles. If, on the other hand, two like poles are placed near each other, a field of force, as shown in *Fig. 5*, is the result. This information is more useful as an indication of what happens rather than why it happens.

Every bar of iron might be supposed to be made up of very small particles which are permanent magnets. The particles have no definite arrangements, but are spread in a topsy-turvy way through the iron bar, *Fig. 6*. In the presence of a magnetic field, the particles swing around like compass needles as the magnetic field increases until they can swing no further, as shown in *Fig. 7*. The bar of material is then said to be magnetically saturated.

According to this theory, there is a definite limit to the amount of magnetism which a given piece of iron can have. When all of the little magnets are lined up in perfect order (like soldiers facing the same way) nothing more can be done about it, no matter how strong the magnetizing force. That is why such a magnet is said to be saturated.

The electromagnetic field or electromagnetism was discovered by Oersted in 1819, when a compass needle happened to be near a wire through which an electric current was flowing. It was found that the current, when flowing in one direction, would deflect the needle of the compass in a direction at right angles to the direction of the current. If the direction of the current were reversed or if the wire were placed beneath, instead of above the compass, the needle would swing in the opposite direction, *Fig. 8*.

This brought about the "thumb-rule" for a magnetic field around a wire which reads as follows: Grasp the wire with the right hand so that the thumb points in the direction of the current, the fingers will then point in the direction of the magnetic field, *Fig. 9*.

It is evident from Oersted's experiment that a current sets up a magnetic field at right angles to the conductor or wire. This can be illustrated by passing a strong current through a vertical wire which passes through a piece of cardboard. If iron filings are sprinkled on the cardboard and the latter tapped slightly while the current is flowing, the filings arrange themselves in a concentric circle. If a small compass is placed at various positions on the cardboard, the needle will indicate the lines of force.

When the length of wire is wound on an iron core, the lines of force created by each turn of wire add together and give the electromagnet definite north and south poles. These electromagnetically created poles are identical to the earth's poles in that the north pole of an electromagnet attracts the same point of a compass as does the earth's north pole. Another right hand rule is used to determine the polarity of an electromagnet. Grasp the coil with the right hand so that the fingers extend in the direction of the current; the extended thumb points toward the north pole.

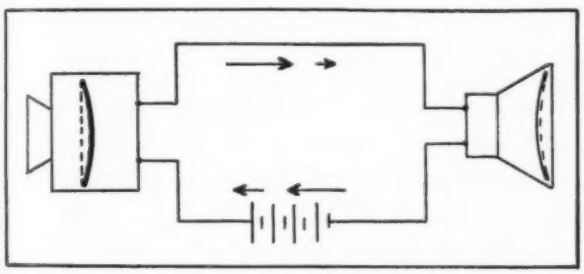


FIG. 17

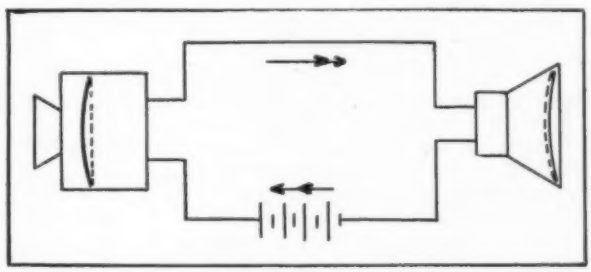


FIG. 18

Fig. 10 shows the magnetic flux (lines of force) around an open coil of wire. If a coil of wire is threaded through a piece of paper and current passed through the wire, the lines of magnetic force will be indicated by sprinkling iron filings on the paper and tapping it gently.

It should be remembered that the di-

(Please turn to page 30)

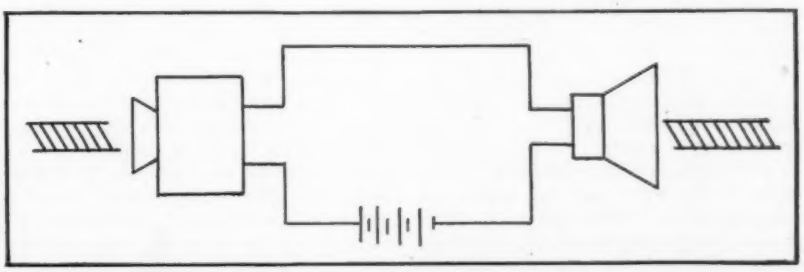


FIG. 19

Current FCC radio allocation hearings would seem to indicate that Chairman Fly favors radio and television groups in reserving frequencies, and that the telephone industry "walked into these proceedings, facing a pretty well stacked deck of cards."

THE LAWYERS have a cute trick worth remembering. When they want to say something they are not sure of, but don't want to risk contradiction, they just say "*quasi*." *Quasi* is a Latin word which means "sort of." Thus, a *quasi* contract is a contract which might not be entirely a contract. A *quasi* libel is a lie which might possibly turn out to be true after all. A *quasi* zebra might be a sport model jackass, and so forth.

Any regulatory body, such as the Federal Communications Commission, calls for a triple dose of this old *quasi* treatment. It resembles all three constitutional branches of our government — administrative, judicial and legislative—but it cannot be positively classified under any of them.

A regulatory commission is not exactly a court, although it hands down orders, fixes penalties, and can even punish for contempt in some cases. So they call it a "*quasi* judicial body." It does not exactly legislate, although it decides such policy matters as what is a reasonable rate, or profit, or rate base. So they also call it a "*quasi* legislative body." It is not exactly an administrative branch because it operates, technically at least, entirely independent of the chief executive and his ministerial hierarchy. So they also call it a "*quasi* administrative body." That fixes up the FCC just fine as far as high-sounding definitions are concerned. But when it comes right down to the specific issue raised in the current popular song "Is-You-Is-or-Is-You-Ain't"—a court, for instance, nobody knows for sure.

And it is not just an academic question, either. If the FCC were a real court, we could expect and insist that it act like a court, strictly complying with its own rules of procedure, and that its members conduct themselves as judges on the bench. Judges on the bench are supposed to act impartially, listen to both sides of any question, and, above all, suspend judgment until all the evidence is in. That is what is known as the judicial temperament.

You might have some trouble finding much judicial temperament around the FCC these days with respect to the current radio allocation hearings. It is beginning to look as if the telephone industry has walked into these proceedings, facing a pretty well stacked deck of cards. This does not refer to the recommendations of the various panels of the Radio Technical Planning Board (RTPB), upon which the telephone industry has had fair representation and experienced cooperative understanding on the part of the technical associates representing radio broadcasting, television, and other groups.

The trouble is right at the top in the FCC, or, to pin it right down to one man, Chairman James Lawrence Fly. Readers of this department will recall that the telephone industry is seeking to establish, in these proceedings, the need for reservations of various frequencies of the radio spectrum to be used now or in the future for various purposes by the telephone industry. The purposes for which the telephone industry is asking these radio frequency allocations are as follows: (1) Emergency telephone service; (2) short-haul toll; (3) long-haul toll; (4) local and area-wide mobile radiotelephone service (for connection with ships, autos, trucks, trains, etc.); (5) special rural telephone service.

Generally speaking, the frequencies sought by the telephone industry for these purposes do not lie in that part of the spectrum which would substantially conflict with the interests of the television broadcasting industry, although it is a little difficult to estimate the exact competitive factor, because of the uncertainty as to just where the television people are going to land finally on the spectrum. There is talk of moving them up into the shorter waves. But whatever is done there has

been no real quarrel between the telephone technicians and the television technicians to date.

On October 4, F. M. Ryan was called as a witness on behalf of the American Telephone & Telegraph Co. Mr. Ryan simply wanted to present a statement for the Bell System as to frequencies required for ship-shore radio-telephone services. Evidently, Mr. Ryan was not expecting to go very much, if at all, into the other radio-telephone uses, particularly the "mobile" telephone or so-called "automobile" telephone.

But there were some other people at the hearing, who were quite interested in stressing the automobile telephone angle. Here is a portion of the record:

"THE CHAIRMAN (Mr. Fly): Why do you need telephone service to traffic on the streets?

"THE WITNESS (Mr. Ryan): Well, that is getting into a different phase of it, but it is a good question.

"THE CHAIRMAN: Why can't they get into a corner drugstore?

"THE WITNESS: They can, but the fellow at a fixed location, that wants to get the car, can't get it that way. And, you take doctors, for example, I think it could be established on a reasonable basis, it would be very important to them. It is important to utilities, it would be a way to reach their people. And also for emergencies, in case of life and death.

"THE CHAIRMAN: I wonder how important it is. You may be talking about convenience, but are you talking about importance?

"THE WITNESS: I think it is a degree of importance that is certainly as great as many of the other things they use radio for.

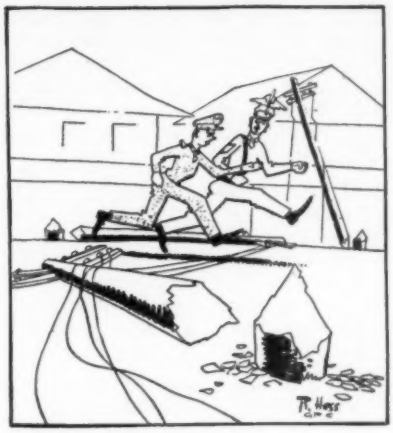
"THE CHAIRMAN: As great as international broadcasting, you think?

"THE WITNESS: I wouldn't be well enough informed to evaluate the relative importance of that. There are so many factors of international policy that enter into it that I don't know about.

"THE CHAIRMAN: It is more important than saving a person the trouble of walking across the street to telephone.

"THE WITNESS: If he is in a motor car it isn't so important, but it is the fellow in the dispatcher's office, or in the doctor's office, somebody wants to get a person. And there are times when you can't get to a telephone. You take during the night hours, even though there are many public pay-stations, they are not always open, and people are up at those hours handling emergency things. And transport trucks use it.

"THE CHAIRMAN: If you are going to meet all those conceivable emergencies, then everybody is going to have to run around with a transmitter and receiver in his vest pocket. We all have those emergencies, you know. Maybe we are coming to that, but I am wondering how important it is. As a part of that system you will have all the people running around the streets with that equipment.



"That Eager Beaver has been at it again!"

"THE WITNESS: I believe that there is a middle-of-the-road course called for in most things. That is, you can go to one extreme or the other. The idea of every man carrying his own telephone and being able to communicate with any other man on foot or on horseback, it may come some time, but I can't vision it coming within the life of any of us.

"On the other hand, I feel this way about it: I don't envisage most private cars being equipped; I don't think the expense would justify it in most instances, but I envisage that for many kinds of service in business enterprise they would use it, and that it is a good middle-of-the-road course.

"Moreover, I feel that a lot of our men in the service, who have experienced the utility of the radio in mobile situations abroad, coming back would be rather surprised that we would question such a thing. I think they would feel that it was just one of the things that would naturally come about.

"THE CHAIRMAN: That is one of the things that is going to give us the biggest headache; those fellows coming back from abroad and thinking they are going to have radio communications in their vest pockets."

It is obvious that Chairman Fly was arguing with the witness. Later on the record indicated (to this writer, at least) that Chairman Fly has pretty well prejudged this issue against the telephone industry. Of course, it does not necessarily follow that the rest of the commissioners are going to feel that way about it, except that a majority of them have generally followed Mr. Fly.

Present at the meeting were Commissioners Walker, Case, Wakefield, Durr and Jett. With the exception of Commissioner Jett, who tried to keep the examination of the witness on a more factual and less argumentative basis, none of the other commissioners had anything to say at all.

Chairman Fly kept asking Mr. Ryan what the most "urgent" need for the so-called "urban mobile" telephone service was. Taken a little by surprise, Mr. Ryan suggested that public utilities (referring to power, gas and other utilities which might require communication between central stations and repair crews of trucks) and doctors, might have the most pressing need for mobile telephone service. Whereupon Chairman Fly, acting more in the capacity of a cross-examining attorney rather than a judge listening with unformed opinion to all sides of the question before his tribunal, proceeded to dispose of Mr. Ryan's suggestions. He stated:

"THE CHAIRMAN: A doctor spends his time on the streets; he is going to see a patient, and if he is orderly in his business, he leaves a number at his office where he can be reached; you telephone his office—and he doesn't want to talk to you anyway so you can't find out what the number is. I don't see how the doctor is going to need it very much. He is not on patrol. He is going from point to point, from telephone to telephone.

"What is your next urgent one?

"THE WITNESS: I believe that the use by people engaged in general trucking enterprises would be one of the important uses.

"THE CHAIRMAN: City?

"THE WITNESS: Yes, I think the city thing would be useful.

"THE CHAIRMAN: I am not talking about convenience. I am talking about urgent need. How is it going to work with trucks?

"THE WITNESS: Well, we can get along without bathtubs, you know.

"THE CHAIRMAN: A lot of people do.

"THE WITNESS: In fact, I expect we could get along without about 90 per cent of the things we have.

"THE CHAIRMAN: But there are some things in this radio picture that are going to be most difficult for us to get along without.

"THE WITNESS: You can make more frequencies than you can bathtubs.

"THE CHAIRMAN: *We are looking for some soft spot in here where the thing is going to give way, and I am wondering if we haven't hit it right here.*" (Emphasis supplied.)

Apparently, Chairman Fly had found what he was "looking for." Commissioner Jett interrupted to point out that Mr. Ryan was talking about very high frequencies which could not conflict with international broadcasting. Mr. Ryan added that while there might be some conflict with television, depending on which plan of spectrum allocation was followed, there would be pretty generous provision for television in any event.

But Chairman Fly had found his "soft spot," and he was not going to let it get by without nailing it down in the record. He continued:

"THE CHAIRMAN: Let us confine ourselves to the need for this. Let us

consider the trucks. How is that going to meet some urgent need? A truck on the city streets. Again, he is not patrolling, is he? He is going from point to point.

"THE WITNESS: I think, from an economic point of view, you would be getting more use out of the truck. You could give better service, and that sort of thing. It would be a very substantial use.

"THE CHAIRMAN: You are getting down to arguments of business convenience. That would be true with every sort of business and that would be true of the people.

"THE WITNESS: That is true.

"THE CHAIRMAN: Now, trucks, again, are not, as a rule, patrolling; they are out at loose ends; they are moving from point to point, from telephone to telephone.

"THE WITNESS: Yes, and very often the man that starts them in motion wishes he could get them just after they start, to take care of something that came up. I think we have all had that experience.

"THE CHAIRMAN: He can tell them to stop at Laurel or Hoboken and telephone in, if it is that important.

"THE WITNESS: I would like to point out that if we strip our radio applications down to those things that are urgent and emergency in character, we would have about 1 per cent — I don't know what the exact percentage is—but I believe it would be almost an infinitesimal part of the present use of radio. There is scarcely anything we use it for, other than just for the safety of ships, and a few things of that character, that we couldn't get along without. They are in the convenience category largely.

"THE CHAIRMAN: But why talk about convenience when we have so many crying needs?"

Mr. Ryan suggested it was almost unbelievable that the FCC should freeze the radio spectrum to the present use being made of it (giving the broadcasters of "soap opera" a virtual mortgage), foreclosing any new developments or new services that have been developed as the result of war experience and have been worked out by the RTPB. But Chairman Fly dismissed this suggestion as "a little emotional outburst." Commissioner Jett then suggested that some of the requests of the telephone industry were "down pretty low in the spectrum," competing with "well-established services," and that he would like to see some of these requests moved up above the 1,000-kilocycle range where there is plenty of space for the accommodation of everybody.

Mr. Ryan pointed out, however, that transmission properties above 1,000 megacycles are entirely "in the line of sight range," meaning that every time an automobile drove behind a tall building or other opaque object, its reception from the point of transmission would be cut out temporarily or blurred.

At this point, the examination of Mr. Ryan continued along more technical lines, with Chairman Fly returning now and then to his plea—"give me one example of urgency." On cross-examination, W. F. Roberts, attorney for the television broadcast interests, who seems to enjoy considerable liberty of action in these hearings in view of the rigid limitations placed on cross-examination at the beginning of the proceedings, questioned Mr. Ryan on the practicality of automobile telephones. Mr. Ryan would not admit that he had ever suggested that television channel reservations on the spectrum should be less than 18. He had speculated personally as to whether the television industry might do with less than 26 channels recommended.

This talk about 18 to 26 channels for television brings us to a realization of the tremendous reservation the television industry is seeking on the spectrum, as compared with the modest request of the telephone industry (although, as stated before, the respective requests do not generally occur in the same range of the spectrum and are not, for that reason, entirely competitive). Twenty-six channels for television means *13 different television programs*, because it is necessary to space these programs one channel apart from its neighbor. A single television channel requires 6,000 frequencies. For purposes of comparison, consider that an ordinary radio receiving set used in the typical city area, does not receive more than six local stations regularly. Even though more stations are available, most people listen to the four broadcasting chains or network programs and perhaps one or two independent local stations.

Yet, here we have the television industry seeking, and quite likely getting, facilities which would allow 13 different television programs to be received simultaneously in any given area. It is hard to imagine the economic and commercial development that could possibly sustain more than three or four television programs for simultaneous operation in any one city.

Briefly, here is what the telephone industry is asking for on the radio spectrum. First of all, no request is made for anything lower down on the spectrum than 100 megacycles with the exception of two emergency channels. Many of these purposes would share the same frequencies—used now for this purpose and now for that. Altogether, the radio requirements shape up as follows:

- 40 channels for short-haul toll (half would range from 148 to 151 mc. and the other half from 163.5 to 166.2 mc.)
- 6 channels for emergency (167.75 to 168 mc.)
- 40 channels for long-haul toll (very high on the spectrum—plenty of room)
- 188 channels for local mobile radio telephone (ranging from 148 to 183 mc.—shared somewhat with toll)
- 32 channels for highway or area mobile (ranging in the 180 to 185 mc.)
- 60 channels for remote control and short haul (in the 156 to 162 mc. range)
- 40 channels for rural telephones (scattered through the 151 to 183 mc. range)

What is going to come of all this? The FCC is not likely to throw out the telephone applications entirely. But it may brush them off by setting them so far up into the short end of the spectrum as to be impractical for contemplated use by the industry.

A Surprise for Any Commercial Manager

K. B. Cary, district commercial manager of the Lincoln (Neb.) Telephone & Telegraph Co., had the surprise of his life the other day when he received a check for $5.40 from a former subscriber who had moved to Oregon without squaring his accounts with the company. Accompanying the check was a note that read: "Just ran across this letter that has been in a trunk we had in storage for several years. Sorry it has taken so long to get it to you."

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THE PLANT MAN'S NOTEBOOK

BY RAY BLAIN • TECHNICAL EDITOR

ACCORDING to the *Bell Laboratories Record*, special telephone sets, designed to eliminate any possibility of igniting gas, are installed in the pump rooms of the "Big Inch" pipe line. These telephones are located in all pump stations as close as practicable to the pumps, gauges, switches and valves so that any abnormal condition may be quickly communicated to other stations to avoid delay in the movement of oil. Telephone service is so vital a part of the control system of the "Big Inch" that every possible provision has been made to insure the efficient working of the telephone system at all times.

* * *

New York City, with nearly 1,900,000 telephones in use, has more than 7 per cent of the total number of telephones in the United States, although it has only 5.5 per cent of the United States' population and 5.8 per cent of the total number of families.

* * *

Small lead covered wire has been extensively used for house wiring in many foreign lands, but has never been used to any extent in this country. Lead is comparatively inexpensive and is one of the best protections against moisture, which is always detrimental to telephone circuits. It is probable that some day all telephone station wirings will be protected by a thin lead covering. It is believed that this feature will reduce station trouble considerably.

* * *

When 1,000 delegates from 45 nations gathered for the United Nations Monetary and Financial Conference at Bretton Woods, N. H., in July, the telephone company serving that locality was faced with a problem. The Mount Washington Hotel, where the conference was held, had been closed for two years and its two-position switchboard was not adequate for the service required. It was necessary to assemble and install a four-position switchboard and about one mile of cable from the hotel to the nearest toll line junction. This installation had to be rushed to completion as the telephone company had been given short notice before the opening of the conference.

Telephone companies in this country will always be faced with problems of this nature where temporary telephone service must be furnished, in volume, on short notice. It seems that some arrangement could be devised whereby equipment, somewhat similar to army field switchboards, could be utilized for such installations. This could be a universal type switchboard, designed to meet all service conditions and traffic requirements even of an unusual nature. It might be a good plan for manufacturers to hold such equipment available, for lease, to any operating telephone company faced with the need of meeting special temporary service conditions.

SPLITTING CABLE SLEEVES: The splitting of lead cable sleeves with a saw is generally considered a difficult operation. This task can be made easy by the use of a piano wire for the splitting operation in the manner shown in the above photograph. The wire does the cutting and is pulled through the lead by the thongs attached to each end.

* * *

We think that a floor switch on a telephone to cut-out the transmitter might be a good idea. This arrangement would prove especially helpful when a telephone is installed in a noisy location.

* * *

The development of a new torque-type screw and bolt driver recently was announced. It is claimed that it completely eliminates all danger of over-tightening or thread stripping. This new driver may be adjusted to any torque desired between one-inch pound and 25-inch pounds for setting screws, small nuts, bolts, etc. Because it disengages itself at the proper torque, it is impossible for the operator to tighten beyond the prescribed fit or tightness.

The mechanism operates on a new principle, it is said, and is not to be confused with the clutch, cam or friction principle. Torque tolerances are very close and are not influenced by excessive oil or other normal, foreign matter, nor by the operator's grasp on the tool. Two different models are

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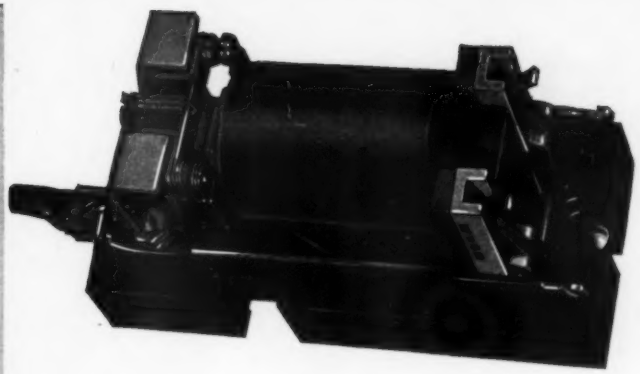
Type 3-A
Arrester Relay



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available; one with a screw driver as an integral part of the shank, and the other with a ¼-inch square drive. Adjustments may be made from outside the handle by easily read calibrated vernier arrangements. Models of this tool, according to the manufacturer, have met wide acceptance in the electrical, radio and telephone fields.

* * *

The following is quoted from a letter from Lloyd C. Henning, general manager, Navajo-Apache Telephone System, Inc., Holbrook, Ariz.:

"I have before me a standard filing cover containing 'The Plant Man's Notebook.' It is five-eighths of an inch thick. The first notebook was clipped from TELEPHONY for February 22, 1941, and the last, from the March 25, 1944, issue. Will later bring it up to date. As you know, I take three copies of TELEPHONY per week, one for filing complete, and two for clipping."

We thank Mr. Henning for his kind words and agree that it is an excellent idea to file useful information so it can be found when required for future use.

* * *

The sheath of overhead and underground cables in the Bell System contains an estimated two and one-half billion pounds of lead alloy.

* * *

Lieut. Galen M. Haven, Signal Corps, a former telephone man from Iowa, and nephew of Carleton Haven of Rockwell City, Iowa, visited the Plant Engineering Agency in Philadelphia, Pa., recently.

* * *

According to the Chesapeake & Potomac *Transmitter*, there are still adults who believe in Santa Claus. It seems a woman called a railway ticket office in Washington, D. C., to make a reservation. She was told there was nothing open at the time, but if she would leave her name and telephone number she would be notified if space became available. Four hours later the prospective customer called the ticket office again and said she thought she had better give them her office telephone number because she was waiting at a pay-station, but thought she had better go back to work.

* * *

Because it has been impossible for telephone companies to replace motor vehicles since March, 1942, about half of those now in service have passed the period when they normally would have been replaced. Repair parts are most difficult to obtain, and care in operation will do much to extend the life of the old car or truck.

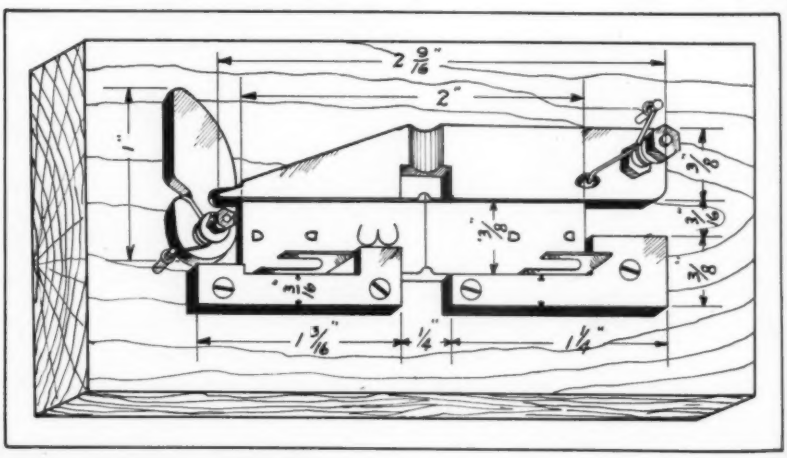
POLE DERRICK: The telephone line construction truck cannot be considered complete unless equipped with a winch and pole derrick. It is surprising to note the number of difficult and dangerous jobs which can be made safe and easy by the use of this equipment. When a heavy pull is made on a pole derrick, jacks should be used to protect the rear truck springs. The approved method of mounting these jacks on a truck body for convenient use is shown in the above picture.

* * *

A letter from Endsley Jones of Western Light & Telephone Co., Kingfisher, Okla., states, with reference to our definition of a telephone engineer which appeared on this page in the August 19 issue, that he has a different version. His definition is: "A telephone engineer is a 'grunt' the lineman dropped his lag wrench on, hitting said 'grunt' on the head, thereby knocking him balmy."

Mr. Jones also states that because all telephone companies are now practicing safety-first and linemen are not dropping lag wrenches, the current shortage of telephone engineers is accounted for.

It is hoped that telephone engineers do not resent this good-natured kidding for it is felt that they can "take it," as well as "hand it out."



FUSE REPAIR TOOL: This kink was sent in by Capt. R. T. Brown, Signal Officer at Aberdeen (Md.) Proving Ground. The drawing shows the details of the tool used for the repair of alarm type switchboard fuses. According to Captain Brown, only about 60 seconds' time is required to repair each fuse with the help of this jig. All metal parts should be made of brass, white metal or aluminum to prevent solder from sticking to the tool.

Manage Kidder, Mo., Exchange

MR. AND MRS. JOHN YORK of Bethany, Mo., recently announced that they will manage the Home Mutual Telephone Co., Kidder, Mo.

V V

Independent Manager Resigns

MRS. CLETA VAN SLYKE, manager and operator of the Liscomb (Iowa) Mutual Independent Telephone Co., tendered her resignation effective October 1. Mrs. Slyke was associated with the company for more than 13 years.

V V

Takes Over Kansas Independent

GEORGE MURPHY recently purchased the controlling interest of the Gorham (Kan.) Telephone Co. from W. S. BRANDT who has managed the exchange for the past 10 years.

V V

Manages Two More Exchanges

WAYNE PECK, manager of the Illinois Commercial Telephone Co. exchanges at Monticello and Deland, recently was named manager of the Bement and Cisco exchanges also.

V V

Announces New Manager

ROY KILLINGSWORTH, Lubbock, Tex., district manager for the Southwestern Associated Telephone Co. announced recently that MRS. HOWARD BROWNING is the new manager of the Morton, Tex., office of that company. She is assisted by MRS. OMAR BYBEE, JR.

V V

Serve as Operators in England

PVT. IRENE C. FAHEY, Chicago, Ill., and PVT. MARY G. LUEDER, Chicago Heights, Ill., are serving as telephone operators, having replaced male soldiers, at the headquarters of the Eighth Air Force Bombardment Division in England, according to a recent report.

V V

To Work as Operator

VIOLA SMITH, formerly employed by the Cawker City (Kan.) Mutual Telephone Co., recently returned to that company from Denver, Colo., to work as an operator.

V V

Manager Resigns

MISS MARY SHOFFNER recently resigned as manager of the Weldon exchange of the Illinois Central Telephone Co.

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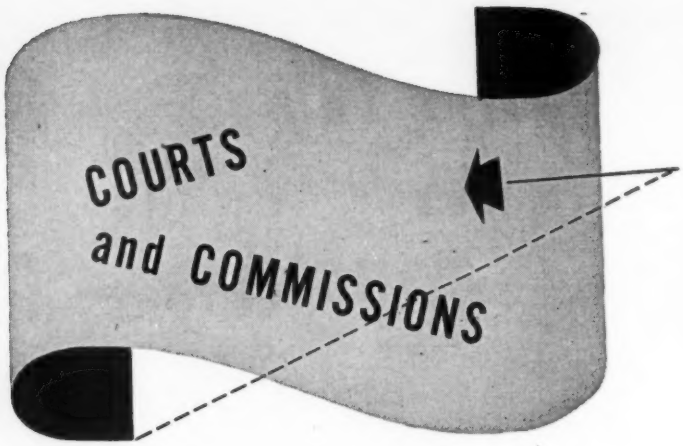


Minnesota Association Aids Small Company

The Minnesota Telephone Association recently became actively identified in a rate case now pending before the Minnesota Railroad & Warehouse Commission. A small telephone company sought a rate increase of $3,000, annually, to provide for higher wages. The Office of Price Administration intervened to determine whether or not small Independent telephone companies are justified in increasing subscriber rates.

The Minnesota association expects to make this a test case with the aim of establishing a precedent which will benefit other small companies.

V V

Oklahoma Commission Fixes Boundary in Territory Dispute

The troublesome question of a division of territory between the exchanges of the Fletcher (Okla.) Telephone Co. and the Cyril (Okla.) Telephone Co. was settled recently by an order of the Oklahoma Corporation Commission. It fixes the boundary between the two exchanges at a distance of about 3½ miles from each.

This is the first time the Oklahoma commission has fixed definite territorial boundaries for telephone companies by an official order. In previous boundary disputes, lines which previously had been agreed upon by the telephone companies involved, had governed in settlement of disputes, excepting where individual circumstances indicated other arrangements.

In this case, however, both companies had complained of invasion by the other, but neither had agreed upon any division of territory. The commission found, as a result of evidence developed at a hearing on January 6, 1944, that the Fletcher company had extended its lines close to the Cyril exchange. (TELEPHONY, January 15, page 31.) The order provides that neither company shall connect with subscribers within the territory of the other. This excepts persons residing on either side of a highway, which forms the boundary between the exchanges, who are free to choose the particular service they desire.

The exchanges have a trunk line over which their subscribers may talk to one another without toll charges. The commission ruled that this arrangement should be continued.

V V

New York Bell Telephone Co. Renews Fight Against City Tax

Attack on the constitutionality of the Binghamton (N.Y.) real estate tax on telephone equipment within private homes and business places was renewed September 27 by the New York Telephone Co.

The company filed, with city officials, a certiorari writ, returnable October 20 at a special term of Broome County Supreme Court, which demanded that the $375,000 assessment placed on the equipment this year, be canceled.

Similar actions, contesting previous years' assessments on the grounds they violate the 14th amendment of the Constitution, the state tax law, general city law and city charter, are pending.

Papers in the case claim that the property is wrongfully assessed as real estate, when in fact, it is personal property and not subjected to real estate taxes.

If the courts should determine the equipment is real estate, the suit also seeks to have the $375,000 assessment reduced by $75,000 on the grounds that $300,000 is the full value for tax purposes. An additional cut of $24,000 is requested on the grounds that the equalization rate of 92 per cent, fixed by the state tax commission, should be applied to what the company contends is the full value.

V V

Asks Permission to Sell Raymond, Calif., Exchange

A. C. Shaw applied to the California Railroad Commission on September 27 for permission to sell the Raymond (Calif.) Telephone Co. for $21,500 to Harry and Edith Baker of Raymond.

Mr. Shaw told the commission he was unable to operate the company because of his age. The company serves several communities in Madera and Mariposa Counties.

V V

Northwestern Bell Buys Mapleton, N. D., Independent

The Northwestern Bell Telephone Co., recently purchased the Mapleton (N.D.) Mutual Telephone Co. The transaction was approved by the North Dakota Public Service Commission at Bismarck, R. A. Devereaux, Northwestern Bell's manager at the Fargo, N. D., exchange, reported.

Monthly rates are: Residence service, $2.75 plus tax, and business telephones, $3.25.

V V

Tariff Sheet Revision O.K.'d

The Northwestern Bell Telephone Co., Omaha, Neb., recently was authorized by the Nebraska State Railway Commission to revise its tariff sheets so as to make clear in its subscribers' contracts that all equipment is the property of the company and that it has full authority to enter upon their premises to install, relocate or rearrange equipment. A clause was added that will make the subscriber liable for all repairs resulting from his willful misuse of equipment.

Commission Orders Rural Service in Border-Line Case

The Oklahoma Corporation Commission, in an order issued September 29, ruled that the residence of B. R. Dodds, is outside the adjacent built-up area of the town of Welch, Okla., therefore, should be served over a rural telephone line, instead of over an individual city exchange line of the Welch-Bluejacket Telephone Co., Welch. (TELEPHONY, September 16, page 40.)

Mr. Dodds had applied to the commission for such rural connection after C. J. Noe, owner of the Welch-Bluejacket company, had refused to give him such service through the Welch exchange on the ground that Mr. Dodds is residing within the built-up area of Welch.

The commission found, in its order, that the Dodds residence is 224 ft. outside the city limits and that a former occupant had been served from a rural line. The commission also found that Mr. Dodds farms 24 acres of land lying west of the city limits, that he purchased stock in a rural line and has made all arrangements to connect to that line. The order fixes the boundary line of the Welch exchange at 100 ft. west of the city limits and states that all residents west of that line, including Mr. Dodds, should have rural telephone service, and all subscribers east of the line should be required to take city exchange service.

V V

Pennsylvania Bell Applies to Purchase Rural Company

The Bell Telephone Co. of Pennsylvania and the South Annville Rural Telephone Co. on September 27 applied to the Pennsylvania Public Utility Commission for approval of the purchase by Bell of the South Annville company and discontinuance of service by the latter.

Pennsylvania Bell has agreed to pay $5,500 for the South Annville company's physical property, except for poles on private property used to furnish service to subscribers, to whom they will be transferred.

V V

Differential and Metallic Service Rates Granted

The Wilcox (Neb.) Telephone Co., with 88 city and 108 rural subscribers, recently was granted permission by the Nebraska State Railway Commission to charge an additional sum of 25 and 50 cents a month for all desk and handsets already in place or to be installed. The company has 38 of these in use at present, but with no extra charge, the demand has exhausted its supply. The new rates for the above instruments are $1.75 for business and $1.50 for residence and rural service.

The construction of new rural electrification lines in the territory it serves has made it necessary to change part of its lines from grounded to metallic service, and the company was permitted to charge 25 cents a month more for the latter.

The Wilcox company has a net investment of $14,172. Last year revenues were $4,718 and expenses, $5,072, leaving a deficit of $354. For the first six months of this year the loss was $297. The new schedule is estimated to reduce the deficit to $176.

V V

Knoxville, Tenn., Questions Southern Bell's Franchise

The Knoxville (Tenn.) City Council on September 19, as one of its moves to avoid increasing indebtedness, approved City Manager George Dempster's recommendation concerning the franchise of the Southern Bell Telephone & Telegraph Co., assigning the city law director, James P. Brown, to try to "Show the company that they have no legitimate or legal franchise in this city," with a view to collecting substantial revenue on a new franchise for the company.

The Southern Bell company is operating in Knoxville on a franchise drawn up in 1907.

V V

New Jersey Bell Takes Over Keystone's Subsidiaries

Following approval by the New Jersey Board of Public Utility Commissioners, the New Jersey Bell Telephone Co., Newark, at the close of business September 20, took title to the physical properties of the Eastern Telephone & Telegraph Co., Camden, and the Camden & Atlantic Telephone Co., both subsidiaries of the Keystone Telephone Co. of Philadelphia. (TELEPHONY, September 9, page 32.)

The Eastern company furnished telephone service in competition with the New Jersey Bell Telephone Co. in Camden, Wildwood, Cape May and some other southern New Jersey communities, serving about 5,700 telephones, while the Camden & Atlantic company operates a toll line only. Both properties will be consolidated with the facilities of the New Jersey Bell Telephone Co. The work necessary for consolidation is expected to take from four to six months.

All employes of the companies purchased have the option of becoming members of the New Jersey Bell Telephone Co. organization. During the period preceding consolidation, the service received by Eastern's customers will continue unchanged.

V V

Tennessee Telephone Companies' Assessments Listed

The Tennessee Railroad & Public Utilities Commission certified to the State Board of Equalization, on September 29, assessment valuations totaling $81,003,350 on properties of utility, bus and truck companies in Tennessee.

The valuation, made for ad valorem taxation purposes for the 1944-45 biennium, were $15,953,350 greater than for the 1942-43 biennium.

The major assessments included:

American Telephone & Telegraph Co., $6,000,000. (An increase from $3,000,000.)

Millington Telephone Co., $10,000.

Munford Telephone Co., $1,000.

Southern Bell Telephone & Telegraph Co., $30,000,000 (an increase from $26,500,000).

V V

Mountain View, Ark., Residents Without Telephone Service

The 745 residents served by the Mountain View (Ark.) Telephone Co. were without local telephone service when the company's manager, Glen Hinke, was inducted into the armed forces on September 20.

Mr. Hinke was unable to employ anyone to service the dial system and received permission from the Arkansas Department of Public Utilities at Little Rock to close the exchange for the duration of the war. There is one long distance connection, however. A direct line to nearby Sylamore furnishes telegraph service. The Southwestern Bell Telephone Co. is expected to install a toll telephone, it was reported.

V V

Oklahoma Commission Refers Rate Case to B. Richardson

The Oklahoma Corporation Commission on October 3 referred the hearing of the application of E. R. Dobson, manager of the Meridian (Okla.) Telephone Co., requesting increased rates averaging 50 cents per month on all classes of service, excepting rural subscribers, to B. Richardson, telephone engineer for the commission, to take place when Mr. Dobson could be present. (TELEPHONY, September 30, page 30.)

Mr. Richardson stated that the exchange has 22 subscribers and for several years has averaged about $40 per

month in gross revenues. The present figures fall considerably below that level, he said. He added that the subscribers had agreed to pay increased rates in order to keep the exchange in operation.

V V

Minnesota Commission Approves Sale and Rural Rates

Following the recent application of the Cannon Falls (Minn.) Telephone Co. to build and maintain a satisfactory telephone system in the town of Leon, Goodhue County, unsatisfactorily being served by the Wastedo Telephone Co., the Minnesota Railroad & Warehouse Commission on October 2 authorized the sale and transfer of all telephone property of the Wastedo company to the Cannon Falls company. (TELEPHONY, September 30, page 27.)

The Minnesota commission also authorized the Cannon Falls company to place in effect, at Leon upon consummation of sale and transfer, the rates for rural multi-party service now in effect at the Cannon Falls exchange.

V V

Summary of Commission Rulings and Hearings

Federal Communications Commission

September 25: Granted extension of special, temporary authority to New England Telephone & Telegraph Co., Marshfield, Mass., to operate Class 2 experimental point-to-point telephone station WIXAF on frequencies 63,000 and 65,000 kilocycles, 15 watts power. Granted on experimental basis only; authority to continue from October 1, until further order of the commission, but not beyond March 1, 1945. Granted same privilege near Kings Highway, Provincetown, Mass.

September 27: Granted American Telephone & Telegraph Co., New York, permission to amend Tariff FCC No. 204, effective October 15, on not less than one day's notice, to provide for the offering to the public of message toll telephone service between points in the United States and Anchorage, Alaska. Granted special permission to amend Tariffs FCC Nos. 132 and 200, effective October 15, on not less than one day's notice, to provide for listing of the City of Anchorage Telephone Co. as a concurring carrier.

California Railroad Commission

September 29: Application filed by A. C. Shaw to sell Raymond (Calif.) Telephone Co. to Harry H. and Edith Marie Baker, and the latter to mortgage the property.

Illinois Commerce Commission

September 27: Hearing on proposed rate advance for telephone service, applying to all exchanges, stated in rate schedule rendered by the Illinois Allied Telephone Co., Princeton.

October 10: Hearing on complaint of Sol Cotler against Illinois Bell Telephone Co., Chicago, as to refusal to furnish telephone service.

October 10: Hearing on complaint of Paul M. Brown as to removal of service by Illinois Bell Telephone Co., Chicago, and the refusal of that company to restore service upon request of complainant.

October 10: Hearing on proposed advance in rates for service in Milledgeville and Chadwick, Ill., stated in rate schedule ICC No. 3, rendered by the Milledgeville (Ill.) Mutual Telephone Co.

October 11: Hearing on application of Farmers Mutual Telephone Co. of Allen for a certificate of convenience and necessity to construct and operate telephone extensions to serve certain customers of the Kinsman (Ill.) Independent Telephone Co., Brookfield Township, Grundy County; and Nevada Township, Livingston County; and for the approval of rates covering such service.

Kansas State Corporation Commission

September 5: Heard and advised Will Stoll and 24 other farmers in their complaint against American Telephone Co., Abilene, and Force Telephone Co., Wheaton, requesting service from Holton.

September 11: Heard and advised Iuka & Byers (Kan.) Telephone Co. on their application for permission to discontinue the exchange at Byers, serving present Byers area from Iuka exchange.

September 29: Ready for commission's action regarding Southwest Telephone Co. filing initial rate area map of Liberal and Pratt, and refiling general tariff "mileage."

October 2: Heard and advised the Cawker City (Kan.) Mutual Telephone Co. in the matter of certain rate changes for service.

October 2: Heard and advised the Farmers Mutual Telephone Co., Upland, on application for authority to make certain rate changes for service at Bala, Ladysmith, Oak Hill and Milford.

October 23: Hearing on application of Farmers Mutual Telephone Co., Wellington, for authority to make certain rate changes for service at Wellington and South Haven.

October 24: Rehearing on application of the Central Kansas Telephone Co., Inc., Topeka, for authority to make certain rate changes for toll service at Greeley.

October 30: Hearing on application of Cedar (Kan.) Telephone Co. for permission to cease operating at Cedar, Smith County.

Missouri Public Service Commission

November 21: Hearing on investigation of Hartville (Mo.) Telephone Co. to determine what changes and improvements are required to provide satisfactory service.

COMING TELEPHONE MEETINGS

New Hampshire Telephone Association, Hotel Carpenter, Manchester, October 19.

South Dakota Telephone Association, Hotel Widman, Mitchell, October 19.

Georgia Telephone Association, Hotel Henry Grady, Atlanta, October 20.

Virginia Independent Telephone Association, Roanoke Hotel, Roanoke, October 26 and 27.

Alabama Independent Telephone Association, Hotel Jefferson Davis, Montgomery, November 13 and 14.

North Carolina Independent Telephone Association, Pine Needles Hotel, Southern Pines, November 13 and 14.

South Carolina Independent Telephone Association, Claremont Hotel, Sumter, November 16 and 17.

Missouri Telephone Association, Hotel Muehlebach, Kansas City, November 21 and 22.

Oklahoma Telephone Association, Hotel Huckins, Oklahoma City, November 27 and 28.

Texas Telephone Association, Baker Hotel, Dallas, March 12 and 13, 1945.

Kansas Telephone Association, Hotel Kansan, Topeka, March 15 and 16, 1945.

Iowa Independent Telephone Association, Hotel Fort Des Moines, Des Moines, April 3 and 4, 1945.

Nebraska Telephone Association, Hotel Lincoln, Lincoln, April 5 and 6, 1945.

Spring Executives' Conference of the United States Independent Telephone Association, Edgewater Beach Hotel, Chicago, April 10 and 11, 1945.

Illinois Telephone Association, Hotel Pere Marquette, Peoria, April 19 and 20, 1945.

Ohio Independent Telephone Association, Deschler-Wallick Hotel, Columbus, April 24 and 25, 1945.

Tennessee Independent Telephone Association, April 27, 1945. City not yet decided.

Indiana Telephone Association, May 9 and 10, 1945. City not yet decided.

November 22: Hearing on investigation of Galena (Mo.) Telephone Co. to determine what changes and improvements are required to provide satisfactory service.

New York Public Service Commission

October 13: Hearing on petition of Sheldon A. Birdsall and David R. Birdsall for approval of sale of Margaretville (N.Y.) Telephone Exchange to Sheldon A. Birdsall.

Wisconsin Public Service Commission

October 11: Hearing on investigation of alleged failure of United Telephone Co., Monroe, to extend service to two subscribers from its Albany exchange.

V V

Telephone Demand May Stabilize, Eastern Executive Says

President J. E. Harrell of the New England Telephone & Telegraph Co., Boston, Mass., has informed stockholders that there is evidence that the present waiting list for telephone service in the five states served by the company [Maine, Massachusetts, New Hampshire, Rhode Island and Vermont] may stabilize around the total of about 75,000 applications, and perhaps decrease as subsidence of war demands releases some instruments and other equipment. Applicants for service, Mr. Harrell stated, have shown a most gratifying understanding and tolerance of conditions.

The New England company recently received the National Security Award for "The maintenance of a superior standard of protection and security," from the United States Office of Civilian Defense. It also received the Certificate of the Chief Signal Officer, U. S. Army, "For loyal and patriotic services rendered the Signal Corps of the Army of the United States in the accomplishment of its vital mission during a period of national emergency."

Mr. Harrell said that plans have been completed to assure employes who are in the armed services a warm welcome and a prompt and efficient re-entry into the organization. "We have told each of these 1,819 people," he stated, "that we will need their skills, their energy, their enthusiasm to meet the challenge of many new types of activity in the coming years; that we must keep pace with the rapid progress being made in the radio and television fields, that our dial program must be resumed, that we must rebuild our plant to make up for the wear and tear of war years, improve our procedures and establish and try to better our prewar service standards."

V V

12,000 on Bell Pensions

More than 12,000 retired Bell System people are on the service pension payrolls of the various companies, including Western Electric and Bell Laboratories. About two-thirds are men. The total annual service pension payroll rate is more than $11,000,000.

V V

Telephone Is Important in Rehabilitation of Wounded

To telephone men and women, "They Fight Again," most recent release of RKO Radio's "This is America" series, will be of particular interest. This new short film tells the story of the rehabilitation of the war's wounded and crippled and the training which enables most of these war heroes to return to a life of useful and productive effort.

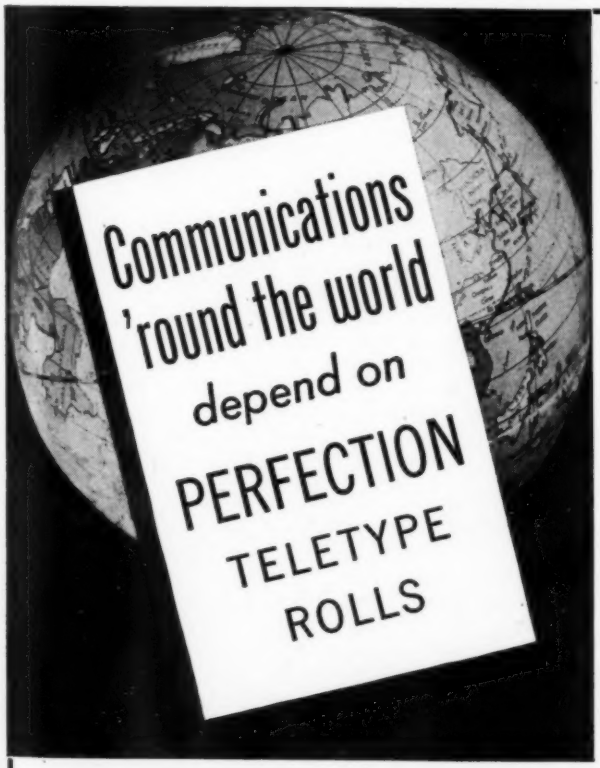
It also depicts the important contribution of the telephone to this rehabilitation, and shows, specifically, the therapeutic value of the telephone call in building up a patient's morale.

V V

Michigan Bell Trains Installation Utility Girls

Because of the acute manpower shortage, the Michigan Bell Telephone Co., Detroit, recently instituted the use of "girl-power" for removing disconnected telephones.

A five day training program, sometimes longer, if necessary, was set up to teach "installation utility girls" the required skill.



In a time of greatest emergency, PERFECTION Teletype Rolls again and again have offered convincing *proof* of superiority. In every corner of the globe they're doing their part to keep vital war messages ticking smoothly over the wires.

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2. The Nicopress sleeve is made with a groove that stops the wire at the center of the sleeve —with side cutting pliers the sleeve may be pinched close to center groove, thus holding the wire in place.

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ABC of the Telephone

(Continued from page 15)

rection of the current, and not the end at which it enters a coil, fixes the polarity of an electromagnet. Practical magnets have many layers of wire, however, the current flows through each turn in the same direction. Therefore, they all add to the strength of the magnet.

Each turn of wire produces its own lines of force; the greater the number of turns, the stronger the magnet. Lines of force are caused by the current flowing through the windings of a coil of wire; doubling the current doubles the number of lines. The strength of an electric current is expressed in amperes. The magnetic strength of a coil of wire without an iron core, called a solenoid, is proportional to the number of amperes and the number of turns. The number of turns multiplied by the number of amperes gives a product in ampere turns, which determines the strength of the magnet. This means that a solenoid with 200 turns, through which an ampere of current flows, will have the same strength as one of 400 turns, carrying five-tenths ampere or 500 milliamperes. In either case, the strength of the magnet is expressed as 200 ampere turns. As a net result, the strength of the electric current determines the number of turns of wire to be placed on a particular coil.

An iron core placed within a solenoid serves to concentrate lines of force that would otherwise leak out through the air. Therefore, an iron core always strengthens a magnet. With a given number of ampere turns placed on an iron core, the permeability of the core is a factor in determining the strength of the magnet. Wrought iron is more permeable than other standard grades of iron and is used when the strongest magnet is desired.

From the foregoing it can be assumed that a magnetic field can be created by a permanent horseshoe magnet, or by means of passing an electric current through a coil of wire placed on an iron core. A combination of the two is used in the telephone receiver.

Fig. 11 shows the poles of a permanent horseshoe magnet placed near the center of a thin Swedish steel disc, termed a diaphragm. The outer edge of the diaphragm is held firmly in position to provide clearance between the center of the diaphragm and the pole pieces. The side view sketch of this combination indicates the pull of the permanent magnet which causes the diaphragm to bend inward towards the magnet. It must be remembered that this illustration, and others of a similar nature, are exaggerated to show the movement of the diaphragm. In actual practice the clearance between the pole pieces and the diaphragm is approximately 12-thousandths of an inch.

In *Fig. 12* the permanent magnet has been replaced by two coils so wound as to create a north and south pole, bending the diaphragm inward when current is passed through the coils. It does not matter which way the current passes through the coils; the diaphragm is attracted in either case.

Fig. 13 illustrates the same coils wound around the ends of the pole pieces fastened to the permanent magnet shown in *Fig. 11*. Current is now flowing in such a direction that the coil tends to aid the pull of the permanent magnet and the diaphragm is bent more towards the magnet.

However, when the current flows in the other direction, the coil tends to create poles opposite to those of the permanent magnet as shown in *Fig. 14*. This partially neutralizes the effect of the permanent magnet so that the diaphragm is allowed to straighten out more than when no current is flowing in the coil.

The movement of the receiver diaphragm, caused by strengthening or weakening the field of the permanent magnet, is so slight as to be invisible to the eye. The click of the diaphragm, as it changes position, gives an audible indication of diaphragm movement. Actual visible proof of the action taking place can be obtained by the following test. Over an ordinary bar magnet place a solenoid of several turns of wire conected in series with a reversing switch and 12 volts of battery. With the switch open, dip one end of the bar magnet into a pile of iron filings. Raise the bar magnet high enough to give one-quarter of an inch clearance between the filings attracted to the magnet and the remaining filings on the pile. Close observance will indicate the filings remaining in the pile are not influenced by the magnet. Close the switch. If the electromagnet creates a field at this time opposing the permanent magnet's field, a portion of the iron filings will fall away from the magnet. When the current is passed through the coil to strengthen the permanent magnet, the filings on the pile will show definite signs of the additional magnetic force, if they are not actually drawn up to the filings already clinging to the bar magnet.

The combination of permanent mag-

net, wire coils and diaphragm just described comprise the essential elements of the telephone receiver. Reviewing the basic operation of the receiver, the permanent magnet (which is not permanently affected by the action of the coil unless this action is too severe) exerts a continued pull on the diaphragm. The coil of wire wound around the permanent magnet either pulls the diaphragm further toward the magnet or allows it to spring further away.

Fig. 15 shows a battery, switch and receiver in series. When the key is closed, the pull on the diaphragm is changed and the sudden bending of the diaphragm produces a loud click. While the key is held closed, the magnet pull remains constant and the diaphragm is held stationary. However, in *Fig. 16*, the key has been opened, the magnetic pull is lessened and the receiver again clicks as it bends suddenly back to normal position.

In *Fig. 17* the switch has been replaced by a transmitter. When the transmitter diaphragm bends inward the flow of current is increased. The increased current (in this particular drawing) increases the magnetic pull of the receiver and the diaphragm bends more inward. *Fig. 18* shows the transmitter diaphragm has moved outward again; this reduces the current flow, lessens the magnetic pull on the receiver, and the diaphragm bends back to normal position.

When the receiver is connected in a direct battery circuit, the normal position of the diaphragm, at that time, is controlled by the strength of the permanent magnet, plus or minus the strength of the field created by the electromagnet when the transmitter diaphragm is in a normal position.

When a word is spoken into the transmitter, shown in *Fig. 19*, the current flow in the circuit is alternately increased and decreased as the moving electrode moves in and out of the carbon chamber. This fluctuating current makes the magnetic pull of the permanent magnet in the receiver increase or decrease in direct relation and in unison with the change of current strength. The changing magnetic strength keeps the receiver diaphragm moving constantly and with the movement of the transmitter diaphragm.

Therefore, the diaphragm of the transmitter is made to respond to the sound waves of the human voice—the receiver diaphragm moves in perfect unison with the transmitter diaphragm. In summary: The receiver, acting as the mouth of the telephone, repeats what is "heard" by the transmitter.

(To be continued)

Direction 1 to Order U-3 Amended by WPB

An administrative letter was issued by the Communications Division of the War Production Board on August 7, transmitting to telephone companies a copy of Direction 1 to Order U-3. This direction permitted telephone companies to use the blanket allotment procedure authorized by Direction 4 to CMP Regulation 6 for the purchase of controlled materials required for projects authorized on Form WPB-2774 prior to June 10, 1944, except when requirements exceeded specified quantities. WPB-2774 authorizations issued since June 10, 1944, have carried a similar provision.

According to an administrative letter from the Office of War Utilities, dated September 25, Direction 1 to Order U-3 has been amended. This amended direction removes the requirements for specific allotments contained in the previous direction. Telephone companies hereafter may use the blanket allotment procedure and the allotment number U-2 for all controlled material requirements previously authorized on Form WPB-2774 regardless of quantity.

Consistent with the above changes, the WPB Office of War Utilities will no longer issue specific controlled material allotments to telephone companies, but will assign the blanket allotment number U-2 in future authorizations on Form WPB-2774. Telephone companies are, therefore, authorized to discontinue filling out Section IV of WPB-2774 regardless of the size of controlled material requirements, according to a recent administrative letter issued by OWI.

V V

Moscow-London Telephone Used After Five Year Halt

The first telephone call between the Moscow and London United Press bureaus since July 31, 1939, before the war, was made October 1, 1944, by Henry Shapiro, chief of the Moscow bureau, who telephoned a dispatch on the Polish political crisis.

A telephone operator warned both parties to the call that enemy operatives would record the call and that it was necessary to be discreet. Any violation of security regulations would be reported to the higher authorities, the operator said.

There was occasional fading and there were three breaks in the connection. Once the sound of jamming was audible. It took 50 minutes to complete 11 minutes of talk.

MUSSOLINI
might well have used his hero's advice -
WHAT NEXT Julius?
I TOLD YOU DON'T START SOMETHING YOU CAN'T FINISH!
IF-
he could have reached Julius Caesar over LongLife Drop Wire.
LongLife Drop Wire gives customer and user satisfaction; reduces maintenance costs.
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THE WHITNEY BLAKE CO.
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Additional Municipal Revenue Sought in Minneapolis, Minn.

Adding to a trend which has been spreading among major cities throughout the nation, the possibility of obtaining additional municipal revenue from telephone and other public utility concerns is currently under consideration in Minneapolis, Minn.

Acting City Research Engineer Clifford Brandt reported September 29 to the Minneapolis City Council that approximately $1,700,000 in revenue could be obtained by Minneapolis through a 5 per cent gross receipts tax on public utilities.

Mr. Brandt had been requested to prepare the report by aldermen seeking possible sources of revenue, mainly to permit financing of public relief costs out of current revenue instead of bond funds.

The report, which was referred to the council's public utilities committee for study, estimated that annual gross receipts of Northwestern Bell Telephone Co., Northern States Power Co., Minneapolis Gas Light Co. and Minneapolis Street Railway Co. totalled $34,884,155.

Engineer Brandt said a gross receipts tax could be levied without collection expense and that it would not fall entirely on owners of property but would be distributed among all users of public utilities service. He further contended that it would not be another "hidden tax" passed on to consumers, but would be deductible by the utilities in computing state and federal taxes, and all, or much of it, would be absorbed.

The initial step toward putting the proposed tax in effect in Minneapolis would be obtaining passage of an enabling act by the state legislature. It was suggested that support might be sought from a special committee of representatives of Minnesota cities, which already has started discussion of plans to gain large allocations of state funds to major municipalities.

V V

Allen W. Surrell Retires After 45 Years' Service

After 45 years in the telephone business, Allen W. Surrell, Columbus, Ohio, general contract agent for The Ohio Bell Telephone Co., who started as a night operator at Phoneton (Ohio), retired recently under the company's pension plan.

For 22 years Mr. Surrell handled the company's relations and contracts with Ohio Independent telephone companies, of which there are more than 200 at present. He also contacted other concerns and contract users.

Mr. Surrell says that being the class poet in high school led him into the telephone business. Born in Sulphur Grove, Ohio, a few miles north of Dayton, he obtained his grade and high school education in Bethel Township, Montgomery County. The superintend-

ALLEN W. SURRELL

ent of the American Telephone & Telegraph Co. test-station at Phoneton attended the graduation exercises of the Bethel High School and heard the class poem written by Mr. Surrell. Next day the superintendent offered him a job and on April 12, 1899, he began as a night operator at Phoneton.

On March 1, 1902, Mr. Surrell was transferred to Cincinnati as evening chief operator. He resigned from that position on May 1, 1904. He then held successive positions as traveling chief operator for the United States Telephone Co., Cleveland; district traffic chief in Columbus for the same company from July 1, 1905, to May 1, 1906; traffic manager for the Central Home Telephone Co., Louisville, Ky.; special agent to the general manager for the United States Telephone Co., Columbus, from September, 1910, to May, 1912; district manager for the Home Telephone Co., Dayton; district manager for the Ohio State Telephone Co., Dayton; district manager for the Ohio State Telephone Co., in Toledo; district manager of the Ohio State division at Toledo of The Ohio Bell Telephone Co.; service manager of the Ohio Bell northern division at Cleveland; and on June 1, 1922, became general contract agent in Cleveland, moving his headquarters to Columbus in April, 1931.

V V

Linemen Rescue Invalid From Burning House

William Coffey, 75, an invalid, was rescued on September 22 by a New Jersey Bell Telephone Co. lineman as flames were licking at the bed on which he was lying in his home at Bayonne (N. J.), while the rescuer's partner climbed a telephone pole and put through a call that brought the Bayonne fire department to the scene.

John Yarns, Jersey City, veteran troubleshooter of the Bell company made the rescue, and Richard Corristan, North Arlington, was responsible for bringing the firemen to the scene, preventing a more serious blaze.

The fire started in Mr. Coffey's bedroom closet and apparently was burning for some time before the flames finally broke through the door and began to approach the aged invalid's bed. Fire officials were told later that Mr. Coffey had used matches while looking for something in the closet and probably dropped a lighted match.

The linemen were engaged in repairing wires on the block when they were attracted by the smoke. As Mr. Corristan climbed a telephone pole and cut in the nearest pair wire with a test set to telephone in an alarm, Mr. Yarns hastened into the house, up the smoke-filled hall stairway, into the burning bedroom and, wrapping the invalid in a blanket, carried him down the stairs and into the street to safety.

V V

Telephone Generosity Causes Unfortunate Circumstance

The telephone shortage is more than serious at Asheville, N. C.

A stranger recently called at the home of an Asheville woman and asked permission to use her telephone. Permission was granted, and after the man left, the woman discovered that he had cut the wire and taken the telephone with him.

The woman told police that she did not mean that the man could use her telephone permanently and asked them to find the thief.

V V

Named Aurora, Ill., Manager

The appointment of EZRA MALONE as manager of the Illinois Bell Telephone Co.'s Aurora area, effective October 1, was announced September 23. He succeeds FRANK D. TARR, who has been transferred to other duties. Just prior to this appointment, Mr. Malone held various supervisory positions in the Chicago offices of that company.

V V

Bookie Telephones Confiscated

Nine telephones and a loudspeaker were confiscated in a gambling raid in Chicago, Ill., when four men were seized on September 26.

Oklahoma Association Plans November Meeting

The 1944 annual meeting of the Oklahoma Telephone Association will be held at the Huckins Hotel, Oklahoma City, November 27 and 28, H. W. Hubenthal, secretary, announced recently.

The program is being built around the needs of the small telephone man but subjects presented will also be of interest to the larger companies.

Among subjects tentatively announced by the program committee are: "Postwar Suggestions," to be followed by general discussion; "Rural Telephone Development," followed by discussion primarily designed to help the small telephone man find solutions for his problems; "Wartime Maintenance of Plants;" "Conversion of Small Exchanges to Community Dial Operation;" "The National Telephone Situation," discussed by a representative of the United States Independent Telephone Association; "Social Security," to be presented by an official of the Social Security Administration, and a talk by a member of the Oklahoma Corporation Commission.

V V

Pennsylvania Railroad Asks Telephone Use Extension

The Pennsylvania Railroad has asked the Interstate Commerce Commission for authority to install train telephone equipment on a little more than 284 miles of its lines, it was announced September 27.

The telephone service, intended to supplement existing block signal systems, would be used on the main line between Harrisburg and Pittsburgh; on the Middle and Pittsburgh Divisions, and between Petersburg and Altoona, on the Hollidaysburg Branch of the Middle Division.

The proposal would involve installations on 300 passenger and freight locomotives and 90 freight cabooses. The system would be interlocked with block stations and other points.

V V

Cable Splicers Flown to Europe Build Communications Lines

A dramatic experience has come to 30 Bell System cable splicers who volunteered recently for 90 days' emergency duty in Europe, to help build communications lines in the territories from which the beaten Nazis have been driven.

The men were prepared for three months of what the U. S. Army Signal Corps called "arduous duty." They are to work side by side with Signal Corps personnel.

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RECOMMENDS—

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SPLICING SLEEVES FOR MAKING FASTER LINE SPLICES

1. CLEAN end of wire

2. INSERT wire in sleeve

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PROVEN ABILITY To "Take It"
ARMSTRONG "Whitall Tatum" GLASS INSULATORS

107 years of "Whitall Tatum" glass-making experience are back of Armstrong's Glass Insulators.

Combined with this experience are the Company's wide engineering facilities.

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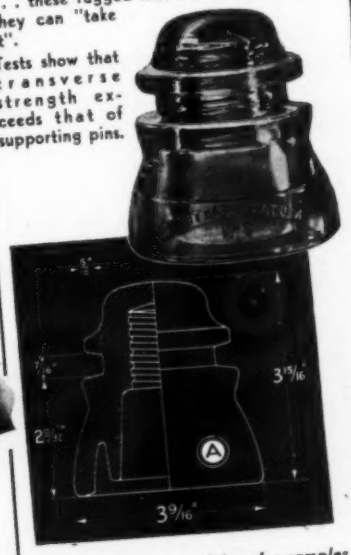
Outstanding characteristics of Armstrong's Glass Insulators are accurate dimensions and true pin fit, and ability to withstand all weather conditions. In torrid heat or extreme cold . . . in rain or in snow . . . these rugged insulators have proved they can "take it".

Tests show that transverse strength exceeds that of supporting pins.



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Flown across the Atlantic in Army planes, the men arrived in Europe in September and went to work. The flying trip was the culmination of a hurry-up telephone call to the American Telephone & Telegraph Co. Arrangements were expedited and within a few days the selected volunteers from seven Bell System companies reported to the Army in Washington.

In the capital they were given rigorous physical examinations by the Army, passports were provided, and other necessary arrangements made.

The men wear uniforms provided by the Army, with arm bands to distinguish them from regular Army personnel.

V V

Signal Corps Conservation Exhibit Shows Vast Savings

The Signal Corps Conservation Exhibit, being shown during the month of October in the Pentagon Building, Washington, D. C., graphically illustrates how a few of the 10,000 manufacturers producing more than 100,000 stock items for the Signal Corps have been able to effect vast savings in critical war materials and in equally critical manpower. It portrays, in numerous display panels, some of the methods by which approximately one billion dollars' decrease in contracts costs was accomplished in producing 1,551,000 tons of equipment.

The announced purpose of the exhibit is "To demonstrate how the Signal Corps, through its suppliers, has effected economies. . . . by means of substitution of materials, simplification of design, development engineering and other methods."

In the making of Army field telephones, aluminum, brass, cobalt steel and leather are saved in thousands of tons by substitutions of zinc alloys, alnico steel and impregnated fabrics.

In the manufacture of military mobile radio stations—and America makes the most powerful ones in the world—industry has learned how to do without aluminum altogether and to save thousands of tons of steel.

In the making of walkie-talkies, improved instruments are produced despite the use of substitute materials. Brass is replaced by steel, mica by impregnated paper, steel by plastic, natural rubber by synthetics and aluminum by steel.

In developing new types of telephone headsets, one company reports saving 1,215 pounds of nickel; 8,000 pounds of stainless steel; 400,000 steel rivets; 800,000 screw machine rivets (by substituting 400,000 header rivets, which give improved performance), and the entire elimination of Japanese silk. Due to the newly-developed headsets, the same company reports a monthly reduction of 22,600 man hours.

The Signal Corps Conservation Exhibit goes far to prove that "America has beaten Germany at her own game of 'Ersatz'." Similarly, in redesigning, in development engineering and in all things that make for conservation of material and manpower, we have drawn far ahead of our admittedly efficient foe in Europe. German spokesmen, in rare moments of candor, have admitted this publicly and have viewed it with alarm.

V V

OBITUARIES

GEORGE DICKE, 50, a proprietor of the Dicke Tool Co., Downers Grove, Ill., telegraph and telephone supplies manufacturing concern, was electrocuted by an electric power line which ran through the branches of a butternut tree he had climbed while picking butternuts on September 24. He is survived by his widow, one sister and six brothers.

* * *

MISS ORA E. DOWNING, manager of the Gresham exchange of the Lincoln

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It takes not only a knowledge of the needs, but specialized equipment to be assured that each directory is complete and accurate.

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PLANTS ALSO LOCATED IN
NEW YORK PHILADELPHIA
MILWAUKEE

(Neb.) Telephone & Telegraph Co. for 20 years, died September 21 at the home of her sister, Mrs. Max Adams. She is survived by another sister and three brothers.

* * *

JAMES E. CALDWELL, 90, former owner of the Cumberland Telephone Co. of Nashville, Tenn., died at his home in that city on September 26.

Mr. Caldwell played an important part in the financial development of the South after the Civil War, starting work at 16 as a bookkeeper in a grocery store at $40 a month. An early investment in an insurance company was successful and he followed this with the building of a portion of the Nashville street railway system.

In 1890, after taking over the Cumberland company, he expanded it to cover several southern states. He also organized the First and Fourth National Bank of Nashville, which was merged in 1930 with the American National Bank.

* * *

MRS. J. M. CURRY, wife of J. M. Curry, manager of the Yelm (Wash.) Telephone Co., died on September 13 after an extended illness.

* * *

WILLIAM J. MILLER, 55, Scarsdale, N. Y., civil and electrical engineer for the New York (N.Y.) Telephone Co., died September 30 in the White Plains (N.Y.) Hospital.

He is survived by his widow; a son, Sgt. William J. Miller, Jr., of the Army, and a daughter.

* * *

BENJAMIN W. BURCH, 71, Cardington, Ohio, former employe of the Morrow County Telephone Co. for many years, died recently at the home of his sister near Cardington, following an illness of two months.

He is survived by his sister and brother.

V V

Communications Transferred

When Allied headquarters for the Mediterranean Area was moved from North Africa to Italy, the transfer of communications operations was made with scarcely a moment's interruption. At one minute before midnight, the facilities were in service in the North African headquarters. At midnight, they were in full operation from the central point in Italy, hundreds of miles away.

WEAR THE RED FEATHER. Contribute to the Community and War Fund

STROMBERG-CARLSON
RECOMMENDS—

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. . . of manufacturing experience and service back up the high reputation always associated with

MORLEY PRODUCTS

Mfg. by The Morley Company of Portsmouth, N. H.

MORLEY is in the business of war production now, and the Army and Navy "E" Award with two stars is a testimony of their sincerity of purpose.

When the sound of fury has died, The Morley Company will be back in consumer production again.

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RAYTHEON
RectiChargeRs

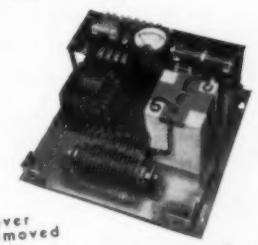
Cover Open

A Raytheon Recti-ChargeR and batteries provide an automatic AC-DC power system. RectiChargeRs—

- Keep batteries fully charged.
- Prevent overcharge and undercharge.
- Increase battery life as much as 40%.
- Reduce battery maintenance and inspection to once or twice yearly.

Complete range of units—11/12 & 22/24 cells . . . 1 to 12 amps . . . many models for 50 cycles input.

RectiFilteRs
(battery eliminators)



Cover Removed

- Eliminate batteries and the expense of routine service.
- Release charging cable pairs for revenue producing service.
- Provide stabilized DC output voltage.
- Save $30 to $90 a year.

Wide range of models for varied operations . . . 50 or 60 cycles.

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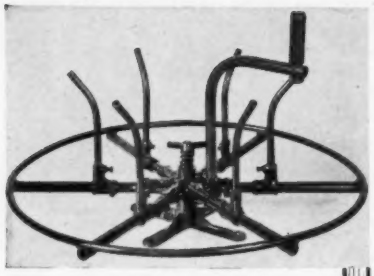

Remember It?

During the war all malleable iron castings have been going into tanks, gun carriages, etc., but shortly now they will be available for civilian products.

Then you can get this combination pay-out and take-up Ready wire reel you have been needing for so long.

Remember—it has the patented cone bearing that wears down on the cone so the spindle never gets wobbly.

★ ★ ★ ★

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(NORTHERN WHITE CEDAR)

FULL LENGTH TREATED

PENTA POLES *GIVE YOU—*

that extra something pole producers have attempted to accomplish for years. . . . The toxic potency of Pentachlorophenol is so great, this full length treatment positively makes the sapwood EVEN MORE RESISTANT to decay than the heartwood . . . resulting in many EXTRA years of trouble-free service added to the already unexcelled long life of natural Northern White Cedar Poles.

We will be happy to make quotations.

•

NAUGLE POLE AND TIE CORP.

WESTERN & NORTHERN CEDAR POLES
317 PLYMOUTH BLDG. • MINNEAPOLIS

Telephones are going to war in ships like this. The cruiser USS Chicago, launched on August 20 at the Philadelphia (Pa.) Navy Yard, is one of hundreds of naval vessels for which Automatic Electric Co. has supplied dial telephone systems and other communication equipment. Replacing an earlier cruiser of the same name, lost in action off Guadalcanal, the USS Chicago was financed by a special war bond drive in the Chicago area. Representing Automatic Electric employes at the launching ceremonies were W. A. CHAPIN and G. L. PETITGOUT of Automatic Electric Sales Corp.

Rubber's Future Discussed By U. S. Rubber Co.'s Chairman

F. B. Davis, Jr., chairman, United States Rubber Co., recently discussed "Rubber's Future—Natural and Synthetic," before the Commonwealth Club of California at San Francisco.

In his address, Mr. Davis reviewed the rubber picture in prewar days as compared to our wartime activities and weighed the future of the two as to price, production and uses.

Discussing prewar years, he said that just before the war America consumed 600,000 tons of rubber a year, 70 per cent of which went into tires. More than 90 per cent of our natural rubber came from the Far East, now occupied by the enemy. Rubber sold for as much as three dollars a pound in 1910, and for as little as three cents a pound in 1934.

Turning to wartime activities, Mr. Davis pointed out that in 1943 the United States made 233,000 tons of synthetic rubber of all types, which was about 40 per cent of the year's consumption. The remainder was taken from the nation's stockpile. The 1944 production of synthetic rubber is expected to reach 775,000 tons. The success of the synthetic rubber program was illustrated by a review of California's synthetic plants. This success is vital, as our war machine now consumes as much rubber in two months as was used in all of World War I, Mr. Davis added.

Looking to the future, if, at the end of the war, there has been but little damage to areas now held by the Japanese, total potential production of natural rubber for the world should be about 1,700,000 tons, Mr. Davis said. However, due to neglect, disease and jungle growth, it is supposed that the average plantation output will be reduced by 30 per cent.

"We have estimated world production of 500,000 tons during the first year after possession of the territory (Japanese held) is regained, followed by a gradual increase to a maximum of 1,200,000 tons, providing the price for rubber is adequate to induce the reopening of all areas. What that price is, will depend on the relationship between supply and demand," Mr. Davis stated.

Increased wages in the East Indies, continued restriction on crude production or a subsidy for synthetic, were sighted as factors which might possibly cause higher prices for natural rubber in postwar years. "Perhaps the most important factor of all in determining the future price of imported rubber," Mr. Davis said, "will be the value of our American dollar in terms

of the basic living needs of the Eastern coolie."

"The future of synthetic rubber comes brighter with each additional day's experience in development and production. Personally, I would be greatly surprised if, with the tremendous impetus which has been given to research in this field, we do not succeed in producing tires and other major products from synthetic rubber the equal of natural, and at a competitive price," the chairman concluded.

V V

Statement of the ownership, management, circulation, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of TELEPHONY, published weekly at Chicago, Ill., for October 1, 1944.

State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared Ralph C. Reno, who, having been duly sworn according to law, deposes and says that he is the editor of TELEPHONY and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Telephony Publishing Corp., 608 S. Dearborn St., Chicago 5, Ill.; editor, Ralph C. Reno, 608 S. Dearborn St., Chicago 5, Ill.; managing editor, Ralph C. Reno, 608 S. Dearborn St., Chicago 5, Ill., and business manager, H. D. Fargo, Jr., 608 S. Dearborn St., Chicago 5, Ill.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Telephony Publishing Corp., 608 S. Dearborn St., Chicago 5, Ill.; H. D. Fargo, 608 S. Dearborn St., Chicago 5, Ill.; H. D. Fargo, Jr., 608 S. Dearborn St., Chicago 5, Ill.; Ralph C. Reno, 608 S. Dearborn St., Chicago 5, Ill., and A. J. Stults, 608 S. Dearborn St., Chicago 5, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

RALPH C. RENO.

Sworn to and subscribed before me this 18th day of September, 1944.

ALBERT J. STULTS.

(My commission expires Nov. 7, 1944.)

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Cedar Poles
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NEWBERRY—GRAND RAPIDS
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Cedar Poles
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Northern White and Western Red
Cedar Poles—Plain or Butt-Treated

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B. J. Carney & Co., 100 N. 7th St., Minneapolis, Minn.—Western red cedar poles. Pentrex Butt Treated or Plain.

C. M. Christiansen Co., Phelps, Wis.—Northern White Cedar Poles, plain or butt treated. Quotations on request.

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T. M. Partridge Lumber Co., Minneapolis, Minn.—Northern White—Western Red Cedar Poles. Plain or butt-treated.

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Rates 10 cents per word payable in advance.
Minimum charge $2.00 for 20 words or less.

HELP WANTED

HELP WANTED: Immediate opening in foreign service for plant man up to 45 with experience in toll maintenance, construction and engineering. Write Box 2109, c/o TELEPHONY.

WANTED: Experienced Wire Chief or Plant Supervisor, capable of supervising plant and equipment activities of a company operating over 5,500 telephones with three exchanges. Must be familiar with automatic equipment. Permanent position for one who can qualify. Give full information as to age, draft status, experience, education, etc. Write Box No. 2104, c/o TELEPHONY.

WANTED: CABLE SPLICER. To locate in Pennsylvania with company operating approximately 8,000 stations. Permanent position with satisfactory wages for qualified man. Give complete information in first reply, stating previous experience, draft status, etc. If presently working with an essential industry, statement of availibility will be necessary. Write Box No. 2105, c/o TELEPHONY.

WANTED: Experienced telephone engineer capable of making inventories, appraisals; must be qualified on equipment and outside plant engineering. Liberal compensation dependent on qualifications. In answering state qualifications, age, present connections, draft status and send small photograph. War Manpower Commission rules of employment observed. Write Telephone Services, Inc., 16th Floor, Lincoln Tower, Ft. Wayne 2, Indiana.

POSITIONS WANTED

TRAFFIC MAN WANTED by Class A company in Middlewest. Prefer an experienced man who can do quantitative engineering but will consider inexperienced person with previous telephone experience. Permanent position. Good salary for man who can qualify. Furnish full details of experience, draft status, etc. Write Box 2108, c/o TELEPHONY.

WANTED: Able and responsible general plant man for exchange of 875 stations to take care of entire plant including switchboard and cable maintenance. Write Quincy Telephone Co., Quincy, Fla.

WANTED: Telephone Accountant—qualified to supervise all phases of telephone accounting for Class A companies. Give full information as to age, experience, draft status, etc. Attach small photograph. Write Telephone Services, Inc., 16th Floor, Lincoln Tower, Fort Wayne, Indiana.

WANTED: Class A Telephone Company near Cincinnati, Ohio, desires to employ an outside plant engineer, capable of performing the drafting work necessary in connection with its engineering work. Good working conditions and wages. In reply, furnish photo and complete information as to age, experience, draft status and starting salary expected. If accepted, a medical examination is necessary. Write Box No. 2102, c/o TELEPHONY.

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DESK AND WALL TYPES

23A DESK TYPE

7—11—14—18—23A

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SEPARATE NEW LOCKS AVAILABLE

BUCKEYE TELEPHONE and SUPPLY COMPANY

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OBITUARY

ALPHEUS HOOVER, 79, prominent Canadian pioneer in telephony, founder of the Home Telephone Co., Ltd., and secretary of the Canadian Independent Telephone Association, died September 12 at his home in Green River, Ont. He had been failing in health and had been confined to his home since the first week in May.

Mr. Hoover entered the telephone business in 1903 when he organized his first Independent telephone company. From that date, he had been an enthusiastic, aggressive and sincere fighter for Independent telephony.

In 1905 the Canadian association was formed. He became the first president and, in 1918, was appointed secretary, an office he held for 22 years.

The original company he organized in 1903 grew, and a few years later, acquired other systems to complete the organization that became The Home Telephone Co., Ltd., now known as the Woodbridge & Vaughan Telephone Co., Ltd., Woodbridge, Ont. He served as president of this company for many years.

Affectionately known as "Dad," Mr. Hoover was a life member of the Telephone Pioneers of America.

V V

Russians Order Equipment

The Russians ordered four million dollars' worth of equipment from the Automatic Telephone & Electric Co., Liverpool, England, it was learned September 28.

WANTED

WANTED TO LEASE, with option to buy controlling stock, magneto or common battery exchange of 200 to 400 stations. Prefer location in northern tier of states. Write Box 2110, c/o TELEPHONY.

FOR SALE

FOR SALE: Group of three exchanges in central Kansas. Annual revenue, $7,500; price, $15,000. Write Box No. 2106 c/o TELEPHONY.

WANTED TO BUY

WANTED: Used copper wire 12 or 14 guage; must be in good condition and priced right. Write Leakey Telephone Co., Leakey, Tex.

TELEPHONE COMPANY WANTED: Public Utility Commission auditor and associates desire to purchase telephone company. Lawyers or trusts or individuals desiring to dispose of same, please write Box No. 2107, c/o TELEPHONY.